

A new genus of the subfamily Zelotinae (Araneae: Gnaphosidae), with descriptions of two new species from Amami-Ōshima Island, Southwest Japan

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Abstract — A new gnaphosid genus of the subfamily Zelotinae is described under the name of *Aponetius* n. gen. The new genus is related to *Zelotes* in having an intercalary sclerite in the male palp, but is distinguished from the latter by the male palp with an embolar radix reduced, a long embolus arising ventrally and a curved ridge on the retrolateral side of the cymbium, and the female genitalia with internal ducts complexly winding. Three species previously assigned to *Zelotes* are transferred to the new genus: *Aponetius gladius* (Kamura 1999) n. comb., *A. ryukyuensis* (Kamura 1999) n. comb. and *A. flexuosus* (Kamura 1999) n. comb. Two new species belonging to this new genus are described under the names of *A. ogatai* n. sp. and *A. watarii* n. sp. from Amami-Ōshima Island, Southwest Japan.

Key words — *Aponetius ogatai*, *Aponetius watarii*, embolar radix, embolus, intercalary sclerite, new combination, tegular base

Introduction

Members of the subfamily Zelotinae are unique among gnaphosids in having a preening comb on the ventrodistal end of the third and fourth metatarsi (Platnick & Shadab 1982a, figs. 1–2). The genus *Zelotes* Gistel 1848, the type genus of this subfamily, is the largest among the gnaphosid genera; about 400 species are known in the world (World Spider Catalog 2019) and 13 species are recorded from Japan (Kamura 2009).

In typical members of this genus, the male palp has the following characters (Fig. 1 A–C). The intercalary sclerite is present on the prolateral side of the bulb; this is a remarkable structure by which this genus is separated from the other zelotine genera (Platnick & Shadab 1983). The embolus has two basal parts, the embolar base and the embolar radix. The embolar base is usually visible from the ventral side, and has a ventral projection, namely the terminal apophysis. The embolar radix is situated on the dorsal side of the bulb as a massive structure and is contiguous to the tegular base, which is the dorsoanterior part of the tegulum (Senglet 2004). The embolar tip usually directs retrolaterally, apically or dorsally. The conductor is membranous and lies dorsally to the embolar base. (For the type species of the genus, *Z. subterraneus* (C. L. Koch 1833), see Platnick & Shadab 1983, figs. 2–3.)

While three species of this genus known from Nansei Islands of Japan, *Zelotes gladius* Kamura 1999, *Z. ryukyuensis* Kamura 1999 and *Z. flexuosus* Kamura 1999, have an un-

usual structure of the male palp (Fig. 1 E–H): the embolus is long, arises ventrally, surrounds the bulb dorsally and reappears retrolaterally; the embolar radix is reduced, situated in the central part of the bulb and hence not contiguous to the tegular base; the conductor is reduced, situated from dorsally to prolaterally to the embolar base; the intercalary sclerite and tegulum are pushed aside retrolaterally by the proximal part of the embolus.

Although I assigned these species to *Zelotes* because of the presence of an intercalary sclerite in the male palp (Kamura 1999, 2003), the conformation of the male palp of these species are radically different from that of the usual species of *Zelotes*, especially in the condition of an embolar radix that is reduced and not contiguous to the tegular base. Up to the present, 18 zelotine genera have been known besides *Zelotes* (Azevedo et al. 2018, Chatzaki 2018); among these genera, the presence of an embolar radix is recognized also at least in *Civizelotes* Senglet 2012, *Drassyllus* Chamberlin 1922, *Heser* Tuneva 2004 and *Trachyzelotes* Lohmander 1944 (Senglet 2004, 2012). In one of them, *Drassyllus*, the embolar radix is larger than that in *Zelotes* and it is easily seen from the ventral side (Fig. 2; the structure that was treated as the embolar base in Platnick & Shadab (1982a) and Kamura (1987) is correctly the embolar radix), but its relative position of the terminal apophysis, embolar base, conductor and embolar radix is similar to that of *Zelotes*. The similarity in the relative position of these structures is recognized also between the two genera and the species from Nansei Islands, but in the latter, the whole

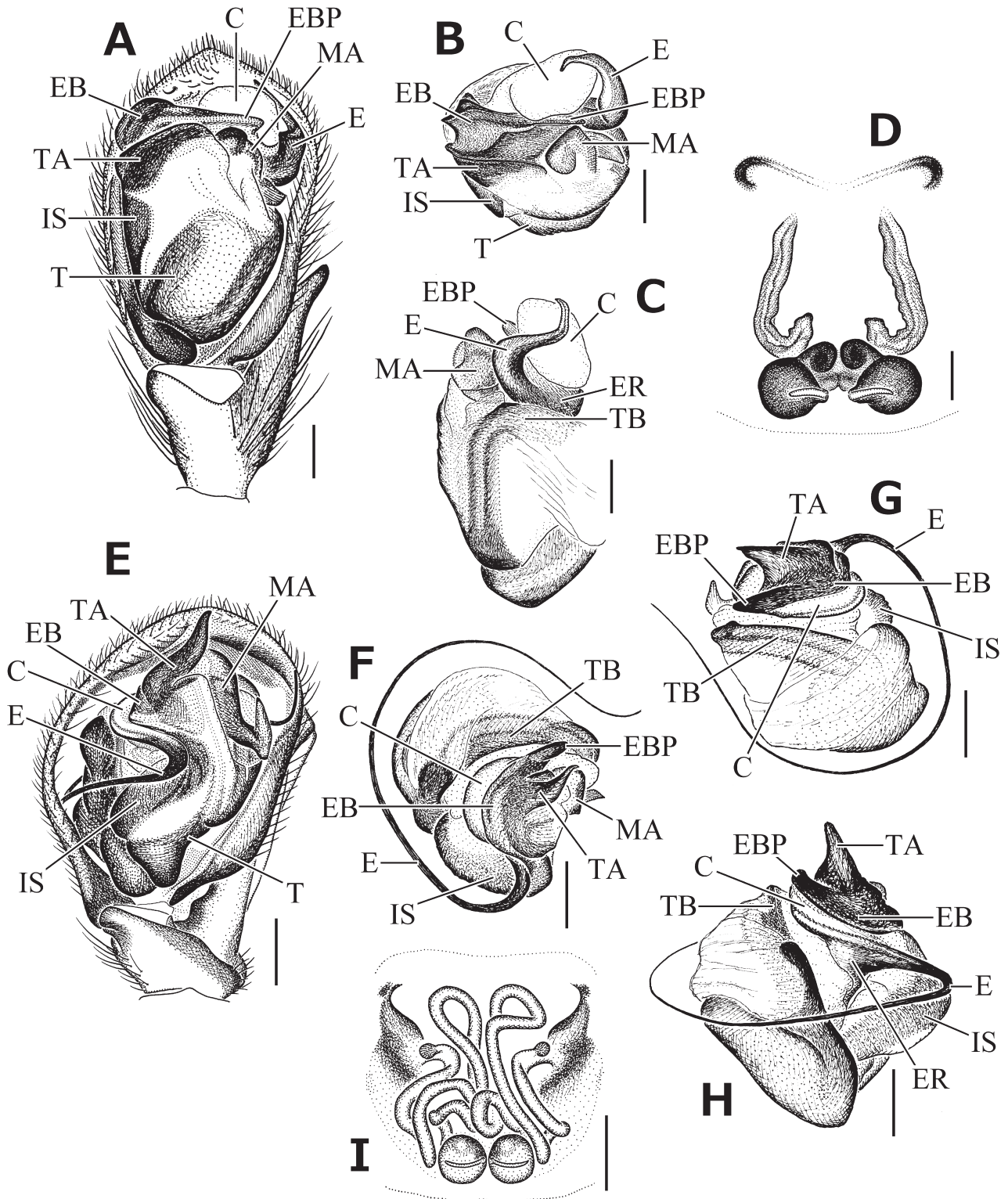


Fig. 1. A–D, *Zelotes kimwha* Paik 1986; E–I, *Aponetius gladius* (Kamura 1999) n. comb. A, E, left male palp, ventral view; B, F, bulb of left male palp, apical view; C, same, dorsoretrolateral view; D, I, female internal genitalia, dorsal view; G, bulb of left male palp, dorsoapical view; H, same, prolateral view. Abbreviations: C, conductor; E, embolus; EB, embolar base; EBP, embolar base projection; ER, embolar radix; IS, intercalary sclerite; MA, median apophysis; T, tegulum; TA, terminal apophysis; TB, tegular base. Scales = 0.2 mm. A, after Kamura (2000); D, after Kamura (2003); E, I, after Kamura (1999).

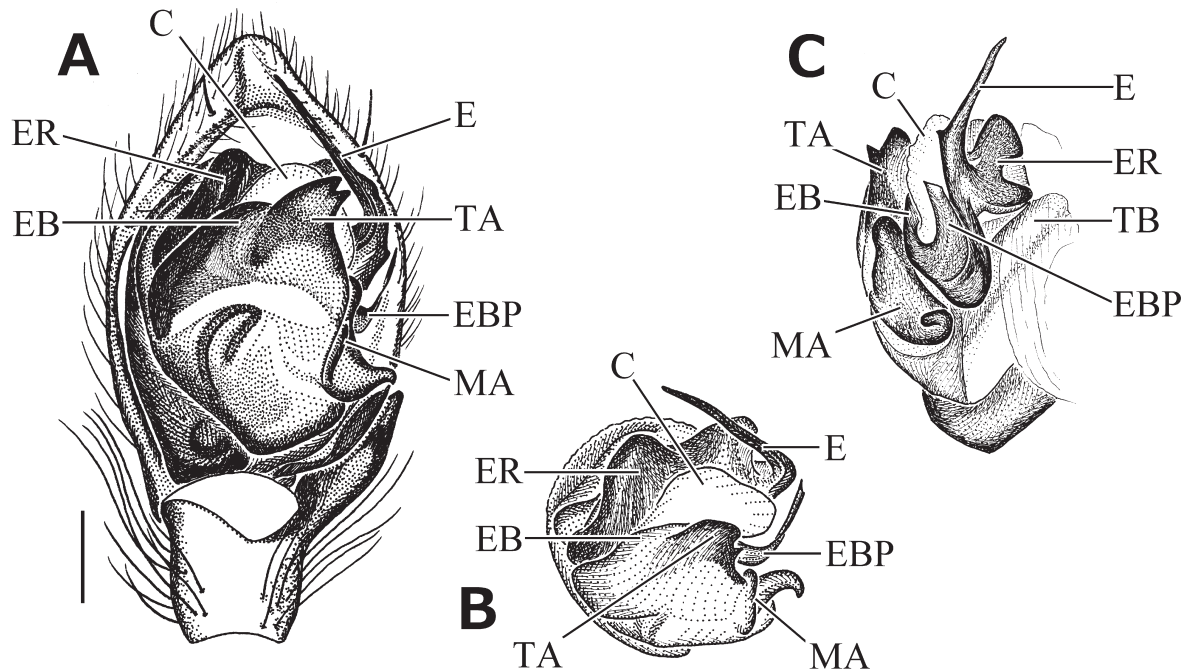


Fig. 2. *Drassyllus sanmenensis* Platnick & Song 1986. A, left male palp, ventral view; B, bulb of left male palp, apical view; C, same, dorsoretrolateral view. Abbreviations are the same as those in Fig. 1. Scale = 0.2 mm. A, after Kamura (1987).

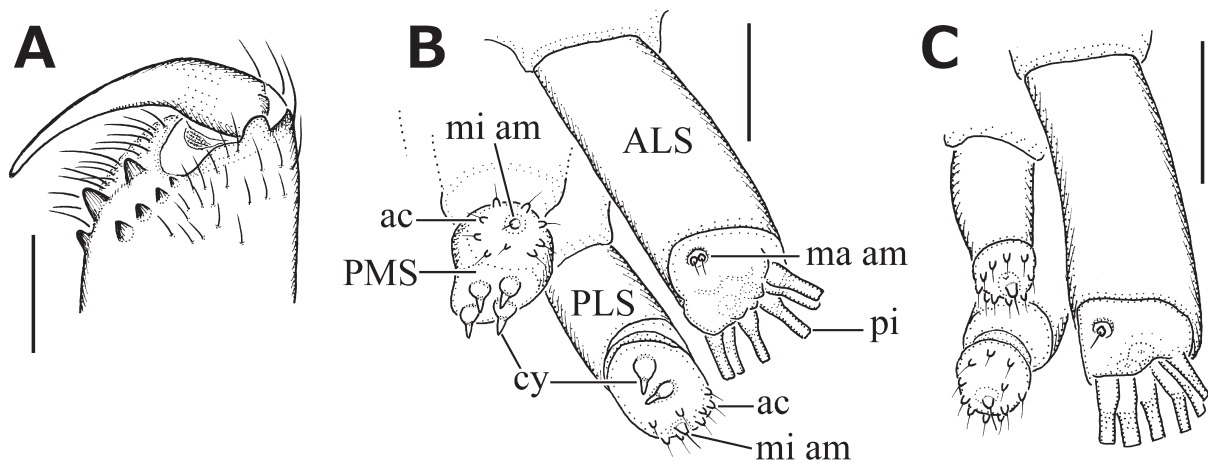


Fig. 3. *Aponetius gladius* (Kamura 1999) n. comb. A, left chelicera, ventral view; B, left female spinnerets, posteroventral view; C, left male spinnerets, posteroventral view. Abbreviations: ac, aciniform gland spigot; ALS, anterior lateral spinneret; cy, cylindrical gland spigot; ma am, major ampullate gland spigot; mi am, minor ampullate gland spigot; pi, piriform gland spigot; PLS, posterior lateral spinneret; PMS, posterior median spinneret. Scales = 0.2 mm.

structure of the male palp is greatly modified due to the reduction of the embolar radix and the difference in elongating direction of the embolus.

Among known zelotine genera, *Zelotes* is the single genus that has an intercalary sclerite in the male palp, except *Cannariognapha* Wunderlich 2011, in which the male palp has

a structure that is regarded as an intercalary sclerite, but it is questionable as the author mentioned (Wunderlich 2011). Although the species from Nansei Islands are simply distinguished from all the zelotine genera except *Zelotes* by having a distinct intercalary sclerite, it is worth comparing them in the whole structure of the male palp. Surveying the known

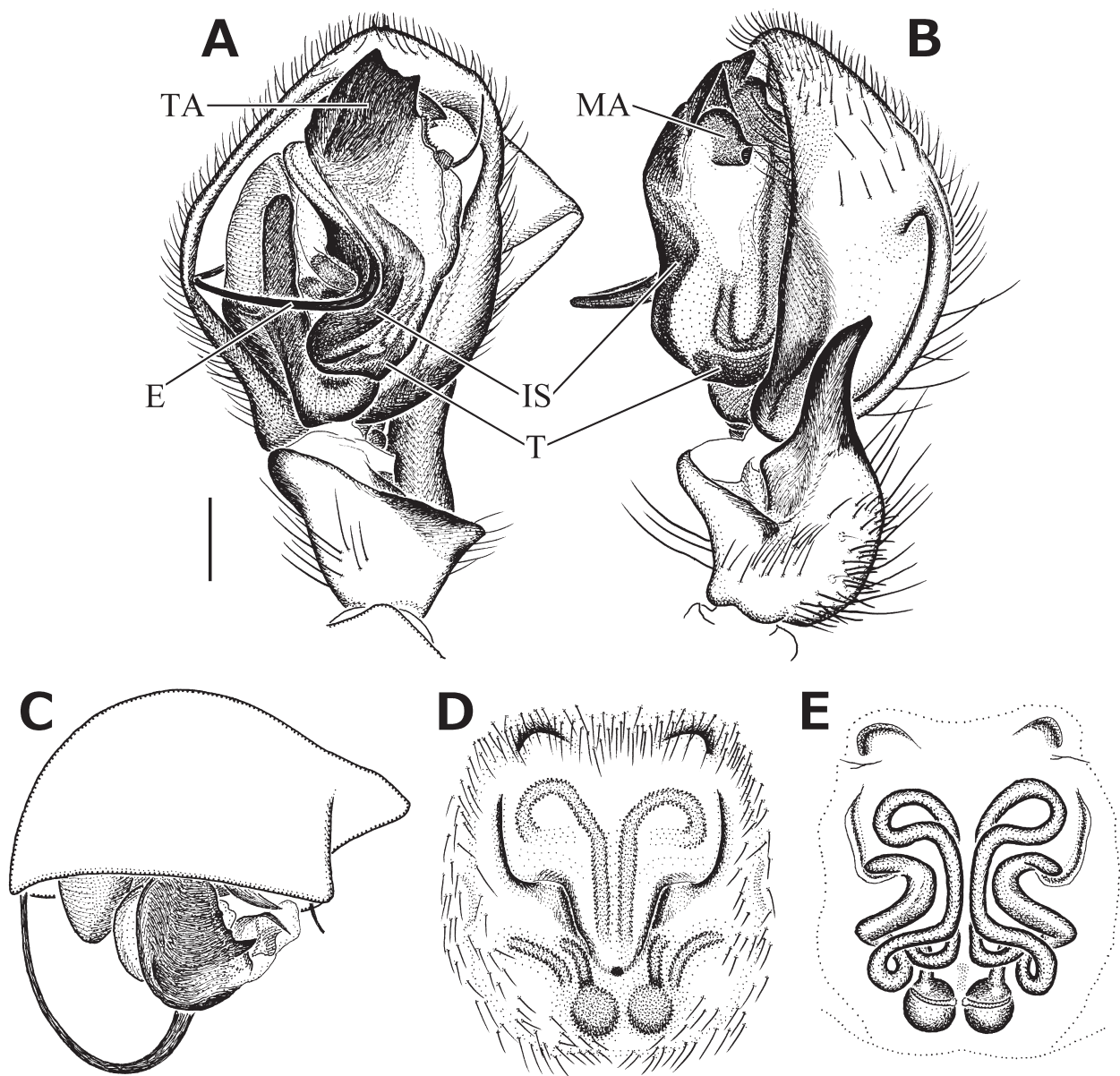


Fig. 4. *Aponetius ogatai* n. sp. A, left male palp, ventral view; B, same, retrolateral view; C, same, apical view; D, epigyne, ventral view; E, female internal genitalia, dorsal view. Abbreviations are the same as those in Fig. 1. Scale = 0.2 mm.

zelotine genera, the characteristic structure found in the species from Nansei Islands does not conform to those of any of the genera. The only exception is *Turkozelotes* Kovblyuk & Seyyar in Kovblyuk et al. 2009; this genus has a superficial similarity to the species from Nansei Islands in the condition of an embolus that surrounds the bulb dorsally and reappears retrolaterally, but this genus is clearly different from the species from Nansei Islands by having a terminal membrane,

which is a membranous structure situated near the terminal apophysis (Chatzaki 2018), as well as lacking an intercalary sclerite in the male palp. In addition, referring to the female genitalia, the copulatory ducts complexly winding that are found in the species from Nansei Islands are unique among the known zelotine genera (Fig. 1 I; cf. Fig. 1 D). (For the structures of the male palp and female genitalia of the genera, see the original description of each genus and/or other

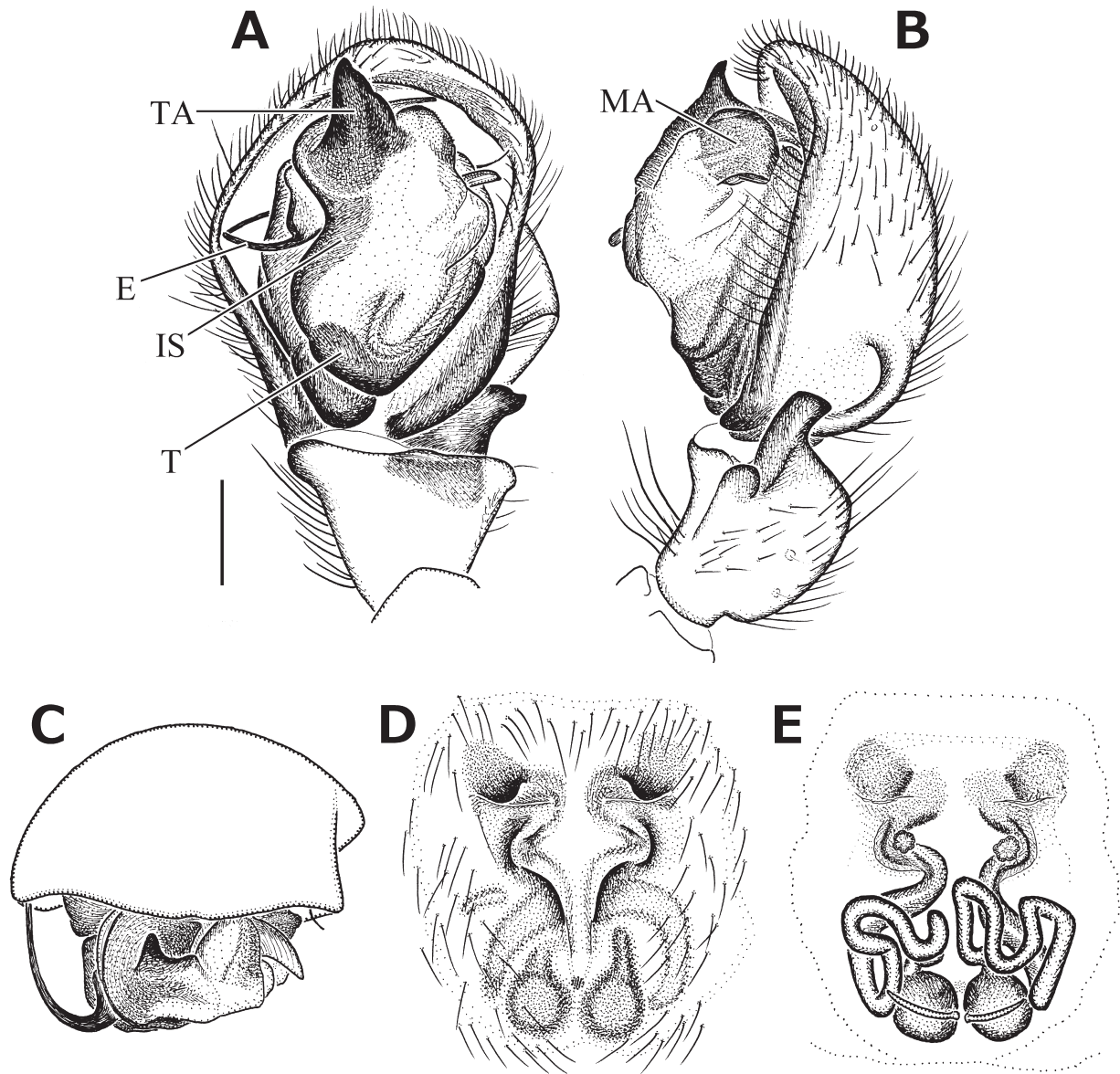


Fig. 5. *Aponetius watarii* n. sp. A, left male palp, ventral view; B, same, retrolateral view; C, same, apical view; D, epigyne, ventral view; E, female internal genitalia, dorsal view. Abbreviations are the same as those in Fig. 1. Scale = 0.2 mm.

references which are shown below in parentheses: *Allozelotes* Yin & Peng 1998, *Berinda* Roewer 1928 (Panayiotou et al. 2010), *Camillina* Berland 1919 (Platnick & Shadab 1982b), *Canariognapha* Wunderlich 2011, *Civizelotes* Senglet 2012, *Drassyllus* Chamberlin 1922 (Platnick & Shadab 1982a), *Echemographis* Caporiacco 1955, *Heser* Tuneva 2004 (Senglet 2012), *Ibala* Fitzpatrick 2009, *Lasophorus* Chatzaki 2018, *Marjanus* Chatzaki 2018, *Setaphis* Simon

1893 (Platnick & Murphy 1996), *Trachyzelotes* Lohmander 1944 (Platnick & Murphy 1984), *Turkozelotes* Kovblyuk & Seyyar in Kovblyuk et al. 2009 (Chatzaki 2018), *Urozelotes* Mello-Leitão 1938 (Platnick & Murphy 1984), *Zelominor* Snazell & Murphy 1997, *Zelotibia* Russel-Smith & Murphy 2005, *Zelowan* Murphy & Russel-Smith 2010.)

The three species from Nansei Islands should be assigned to a distinct genus from *Zelotes*. In this paper, I propose a

Table 1. Lengths of legs of *Aponetius ogatai* n. sp. [male holotype and one of female paratypes (from Amami-shi); male/female].

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.84/1.90	1.14/1.13	1.46/1.40	1.38/1.23	0.96/1.00	6.78/6.66
II	1.60/1.63	0.98/0.98	1.16/1.15	1.14/1.10	0.92/0.88	5.80/5.74
III	1.42/1.40	0.76/0.78	0.96/0.95	1.14/1.13	0.74/0.74	5.02/5.00
IV	1.98/2.03	1.10/1.10	1.52/1.59	1.82/1.83	0.92/0.90	7.34/7.45

Table 2. Lengths of legs of *Aponetius watarii* n. sp. (male holotype and female paratype; male/female).

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	1.70/1.82	0.98/1.08	1.29/1.36	1.18/1.22	0.98/0.96	6.13/6.44
II	1.46/1.60	0.86/0.95	1.03/1.11	1.00/1.06	0.83/0.84	5.18/5.56
III	1.28/1.38	0.70/0.76	0.84/0.91	1.02/1.10	0.66/0.70	4.50/4.85
IV	1.84/2.00	1.00/1.06	1.38/1.53	1.60/1.76	0.82/0.88	6.64/7.23

new genus and describe two new species belonging to the new genus from Amami-Ōshima Island, Southwest Japan.

The type specimens of the new species described in this paper will be deposited in the collection of the Department of Zoology, National Museum of Nature and Science, Tsukuba. The abbreviations used in this paper are as follows: ALE, anterior lateral eye; ALS, anterior lateral spinneret; AME, anterior median eye; MOA, median ocular area; p, proventral; PLE, posterior lateral eye; PLS, posterior lateral spinneret; PME, posterior median eye; PMS, posterior median spinneret; r, retroventral. The eye size means the length of long axis of an eye, but the measurement of the posterior median eye was made at horizontal level. All measurements are given in mm. The terminology on the spinnerets and spigots follows that of Platnick (1990). The format of the description of leg spination follows that of Platnick & Shadab (1975).

Taxonomy

Family Gnaphosidae
Subfamily Zelotinae

Aponetius n. gen.

[Japanese name: Tsuzura-kemurigumo-zoku]

Type species. *Zelotes gladius* Kamura 1999.

Diagnosis. The new genus is distinguished from the known zelotine genera except *Zelotes* by having an intercalary sclerite in the male palp, and from *Zelotes* by the male palp with an embolar radix reduced, a long embolus arising ventrally and a curved ridge on the retrolateral side of the cymbium, and the female genitalia with internal ducts complexly winding.

Description. Anterior eye row weakly recurved and posterior eye row straight or slightly procurved as seen from dorsal side, PME separated from each other by less than the eye size, MOA slightly longer than wide, with anterior width slightly narrower than or almost as wide as the posterior.

Chelicera with three or four relatively large teeth on promargin of fang furrow, with three or four relatively small teeth on retromargin (Fig. 3 A). Thoracic groove longitudinal, distinct. Trochanters of legs without ventral notch. Metatarsi III and IV with preening comb on ventrodistal end. Metatarsi and tarsi of legs without scopula. Leg formula 4-1-2-3. Male abdomen with dorsal scutum variable from two- to three-fifths of abdomen in length. Spinnerets: female (Fig. 3 B): ALS with five or six piriform gland spigots and two major ampullate gland spigots; PMS swollen with four cylindrical gland spigots, one minor ampullate gland spigot and about ten aciniform gland spigots; PLS with two cylindrical gland spigots, one minor ampullate gland spigot and about ten aciniform gland spigots; male (Fig. 3 C): ALS with five or six piriform gland spigots and one or two major ampullate gland spigots; PMS and PLS each with one minor ampullate gland spigot and about ten aciniform gland spigots. Male palp (Fig. 1 E–H): intercalary sclerite, terminal apophysis and median apophysis present; embolus long, arising ventrally, surrounding bulb dorsally and reappearing retrolaterally; embolar radix reduced, situated in central part of bulb; conductor reduced, situated from dorsally to prolaterally to embolar base; proximal part of embolus pushing aside intercalary sclerite, and often intercalary sclerite and tegulum extremely pressed retrolaterally; cymbium with distinct curved ridge on retrolateral side; retrolateral tibial apophysis present. Female internal genitalia with copulatory ducts complexly winding (Fig. 1 I).

Etymology. Generic name is an arbitrary combination of letters and is masculine in gender.

Species included. Three species previously assigned to *Zelotes*: *Aponetius gladius* (Kamura 1999) **n. comb.**, *A. ryukyuensis* (Kamura 1999) **n. comb.** and *A. flexuosus* (Kamura 1999) **n. comb.**; two new species described below.

Aponetius ogatai n. sp.

[Japanese name: Amami-tsuzura-kemurigumo]
(Fig. 4 A–E)

Type series. Holotype: ♂, Yuwangama, Yamato-son, Amami-Ōshima Is., Kagoshima Pref., Japan (28°20'59"N, 129°25'16"E, elevation about 200 m), 6.VI.2017, K. Ogata leg. Paratypes: 1♀, same data as holotype; 1♀, Naze-asani, Amami-shi, Amami-Ōshima Is., Kagoshima Pref., Japan (28°23'58"N, 129°29'16"E, elevation about 150 m), 5.VI.2017, K. Ogata leg.

Other specimens examined. 5♂1♀, Koshuku, Naze-shi (current place name: Naze-koshuku, Amami-shi), Amami-Ōshima Is., Kagoshima Pref., Japan (28°21'45"N, 129°27'38"E, elevation about 250 m), 25.VI–12.VII.2004 (collected by pitfall traps), Y. Watari leg.

Diagnosis. This new species is distinguished from the congeners by the terminal apophysis apically truncated on the male palp, and the recurved ridges situated anteriorly on the epigyne, while the other congeners have a terminal apophysis pointed apically and an epigyne anteriorly with

rounded swellings or without remarkable structure.

Description. Measurements based on male holotype and one of female paratypes (from Amami-shi). Body length ♂5.16, ♀5.92. Carapace length ♂2.36, ♀2.40; width ♂1.86, ♀1.84. Abdomen length ♂2.80, ♀3.52; width ♂1.60, ♀2.16. Eye sizes: AME ♂0.08, ♀0.08; ALE ♂0.13, ♀0.13; PME ♂0.08, ♀0.08; PLE ♂0.09, ♀0.12. Distances between eyes: AME-AME ♂0.04, ♀0.06; AME-ALE ♂0.01, ♀0.01; PME-PME ♂0.05, ♀0.07; PME-PLE ♂0.04, ♀0.04; ALE-PLE ♂0.05, ♀0.04. MOA anterior width ♂0.20, ♀0.22; posterior width ♂0.21, ♀0.23; length ♂0.23, ♀0.25. Clypeus height ♂0.11, ♀0.10. Lengths of legs as in Table 1.

Variation. Body length ♂5.12–5.68, ♀4.72–6.56. Carapace length ♂2.32–2.56, ♀2.28–2.64; width ♂1.80–2.00, ♀1.76–1.96. Abdomen length ♂2.80–3.20, ♀2.44–3.92; width ♂1.60–1.76, ♀1.60–2.16.

Ventral spines on legs I and II. ♂: tibiae: I 0-0-0, 0-1r-0 or 1r-1r-0, II 0-0-0, 0-1r-0 or 1r-1r-0; metatarsi: I 2-1p-0 or 2-2-0, II 2-1p-0 or 2-2-0. ♀: tibiae: I 0-0-0 or 0-1r-0, II 0-0-0 or 0-1r-0; metatarsi: I 2-1p-0, 2-1r-0 or 2-2-0, II 2-2-0.

Color. Male: cephalothorax and appendages dark reddish brown, but mouth parts, sternum and coxae of legs paler; abdomen with dorsal and lateral surfaces blackish brown, ventral surface light brown. Female: similar to male, but wholly slightly lighter.

Male palp (Fig. 4 A–C): terminal apophysis wide with apical part truncated obliquely in ventral view; embolus arising from ventromedian part of bulb; median apophysis relatively small; cymbium with large ridge protruding retrolaterally; retrolateral tibial apophysis long and pointed apically. Epigyne (Fig. 4 D) with a pair of recurved ridges situated anteriorly, median plate anteriorly wide and posteriorly narrow. Female internal genitalia (Fig. 4 E) with copulatory ducts long, complexly winding and occupying most of vulva.

Distribution. Amami-Ōshima Is., Kagoshima Pref., Southwest Japan.

Etymology. Specific name is dedicated to the collector of the type specimens.

Aponetius watarii n. sp.

[Japanese name: Ōshima-tsuzura-kemurigumo]
(Fig. 5 A–E)

Type series. Holotype (♂) and paratype (♀): Kawauchi, Sumiyo-son (current place name: Kawauchi, Sumiyo-cho, Amami-shi), Amami-Ōshima Is., Kagoshima Pref., Japan (28°18'32"N, 129°24'28"E, elevation about 300 m), 24.VI–11.VII.2004 (collected by pitfall traps), Y. Watari leg.

Other specimens examined. 1♀, Kunetsu, Setouchi-cho, Amami-Ōshima Is., Kagoshima Pref., Japan (28°10'20"N, 129°18'47"E, elevation about 300 m), 7.VI.2017, K. Ogata leg.

Diagnosis. This new species is separated from the congeners by the following points. The male palpal embolus arises from the prolateral part of the bulb and the sclerotized swell-

ings are situated anteriorly on the epigyne, while in the other congeners, an embolus arises from the ventromedian part of the bulb and an epigyne anteriorly has recurved ridges or no remarkable structure.

Description. Measurements based on male holotype and female paratype. Body length ♂4.74, ♀6.32. Carapace length ♂2.14, ♀2.36; width ♂1.68, ♀1.80. Abdomen length ♂2.60, ♀3.96; width ♂1.40, ♀2.12. Eye sizes: AME ♂0.08, ♀0.08; ALE ♂0.11, ♀0.13; PME ♂0.07, ♀0.08; PLE ♂0.09, ♀0.11. Distances between eyes: AME-AME ♂0.04, ♀0.05; AME-ALE ♂0.01, ♀0.01; PME-PME ♂0.05, ♀0.06; PME-PLP ♂0.04, ♀0.04; ALE-PLP ♂0.04, ♀0.05. MOA anterior width ♂0.19, ♀0.21; posterior width ♂0.19, ♀0.22; length ♂0.22, ♀0.24. Clypeus height ♂0.11, ♀0.11. Lengths of legs as in Table 2.

Variation. 1♀ other than paratype. Body length 5.40; carapace length 2.32, width 1.84; abdomen length 3.08, width 1.88.

Ventral spines on legs I and II. ♂ and ♀: tibiae: I and II 0-0-0; metatarsi: I and II 2-2-0.

Color. Male and female: cephalothorax and appendages dark reddish brown, but mouth parts, sternum and coxae of legs paler; abdomen with dorsal and lateral surfaces dark grayish brown, ventral surface yellowish brown.

Male palp (Fig. 5 A–C): terminal apophysis pointed apically; embolus arising from prolateral part of bulb; median apophysis relatively large with small flat projection protruding retrolaterally; cymbium with short ridge situated proximally; retrolateral tibial apophysis somewhat short, with apical part bluntly pointed in ventral view. **Epigyne** (Fig. 5 D) with a pair of sclerotized swellings situated anteriorly, median plate relatively narrow. **Female internal genitalia** (Fig. 5 E) with copulatory ducts long, complexly winding and occupying posterior half of vulva.

Distribution. Amami-Ōshima Is., Kagoshima Pref., Southwest Japan.

Etymology. Specific name is dedicated to the collector of the type specimens.

Acknowledgements

I would like to express my sincere thanks to Kiyoto Ogata (Aichi Pref.), Akio Tanikawa (The University of Tokyo) and Yuya Watari (Forestry and Forest Products Research Institute, Tsukuba) for offering the specimens used in this study.

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Received August 19, 2019 / Accepted December 27, 2019